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# **Reevaluation of Three Cold War-Era Buildings at Technical Area 22**

## **Los Alamos National Laboratory**

**Historic Building Survey Report No. 367**

**Survey No. 1223**



Prepared for: the U.S. Department of Energy, National Nuclear Security Administration,  
Los Alamos Field Office

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## EXECUTIVE SUMMARY

The U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office reevaluated three Cold War-era buildings at Technical Area (TA) 22, Los Alamos National Laboratory (LANL) for listing in the National Register of Historic Places (Register). Buildings TA-22-7, -8, and -10 (magazines) were constructed in 1949 to support detonator research, development, and testing and have now been determined eligible for listing in the Register. The three magazines have also been identified as candidates for preservation because of their historical association with the Cold War use of TA-22-1, a historic World War II era Quonset Hut that is eligible for inclusion in the Manhattan Project National Historical Park (MAPR). The magazines, along with a magazine that was previously determined eligible in 2006 (TA-22-9), are located within one of the proposed MAPR boundaries at LANL identified in the 2014 legislation.

In accordance with the National Historic Preservation Act of 1966, as amended, and the *Programmatic Agreement among the U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office, the New Mexico State Historic Preservation Office, and the Advisory Council on Historic Preservation Concerning Management of the Historic Properties at Los Alamos National Laboratory, Los Alamos, New Mexico*, the Field Office is initiating consultation on the reevaluation of magazines TA-22-7, -8, and -10.

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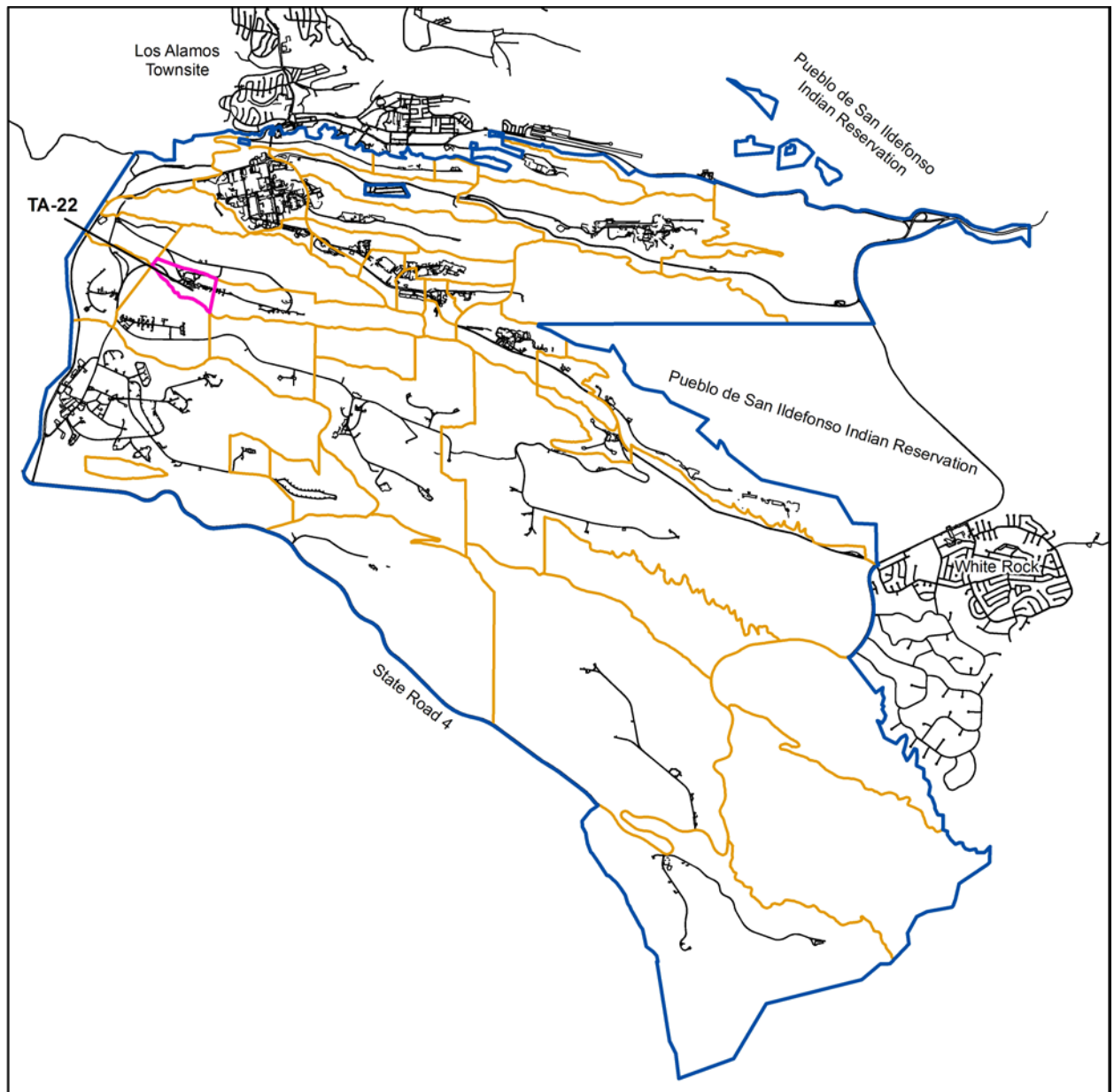
## INTRODUCTION

The U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office (Field Office) reevaluated three magazines (buildings 7, 8, and 10) at Technical Area (TA) 22, Los Alamos National Laboratory (LANL or the Laboratory) (Map 1). This reevaluation was conducted because the magazines have been identified as candidates for preservation due to their association with the almost 40 years of Cold War-era detonator research conducted at adjacent building TA-22-1 (Maps 2–4), a property that is eligible for inclusion in the Manhattan Project National Historical Park (MAPR) for its role in the assembly of the wartime Fat Man bomb.

Cold War-era magazines, TA-22-7, -8, and -10, were originally determined not eligible for listing in the National Register of Historic Places (Register) in *DX Division's Facility Strategic Plan: Consolidation and Revitalization at Technical Areas 6, 8, 9, 14, 15, 22, 36, 39, 40, 60, and 69* (McGehee et al. 2005) in consultation with the State Historic Preservation Officer on April 18, 2006. Many of the magazines at TA-22 are of identical construction, and at the time of the initial evaluation, other magazines were selected as the best examples of type for the purpose of architectural documentation. The reevaluation is being conducted because the status of TA-22-1 and its immediate area have changed since the MAPR was authorized in December 2014. The three magazines, along with a magazine that was previously determined eligible in 2006 (TA-22-9), are within one of the proposed boundaries for the MAPR at LANL and are also now considered candidates for preservation. These magazines were constructed in 1949 to support detonator research, development, and testing, and have served as reinforced storage facilities for high explosives since their construction.

### Historic Property Eligibility Assessment

In accordance with the National Historic Preservation Act of 1966, as amended, and the *Programmatic Agreement among the U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office, the New Mexico State Historic Preservation Office, and the Advisory Council on Historic Preservation Concerning Management of the Historic Properties at Los Alamos National Laboratory, Los Alamos, New Mexico* (PA), this report contains documentation regarding the reevaluation of Register eligibility status for three Cold War-era buildings located at TA-22 (Maps 2–4). Work processes originally conducted at TA-22 supported the Manhattan Project assembly of the high explosives components of the “Fat Man” weapon and, later during the Cold War-era, supported detonator research and testing (LANL 1993, U.S. DOE 1986, McGehee et al. 2005, and McGehee et al. 2011). Property descriptions and recommendations for Register eligibility are included in this report. Appendix A includes historic building inventory forms for the three reevaluated buildings.



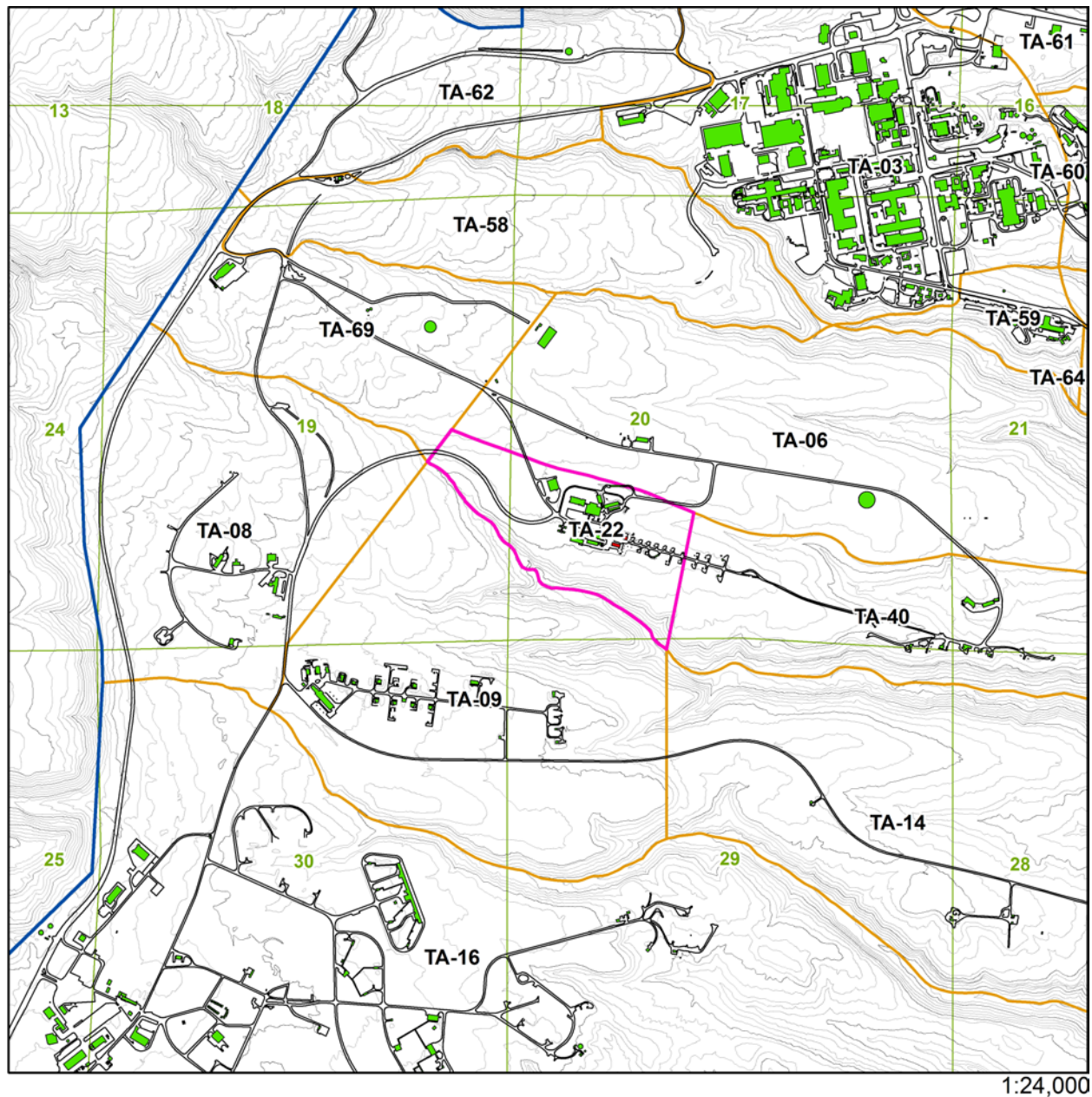
**Los Alamos**  
**National Laboratory**  
*Resources Management Team*  
*EPC-ES Environmental*  
*Stewardship Group*



## LANL Boundary and Technical Area 22

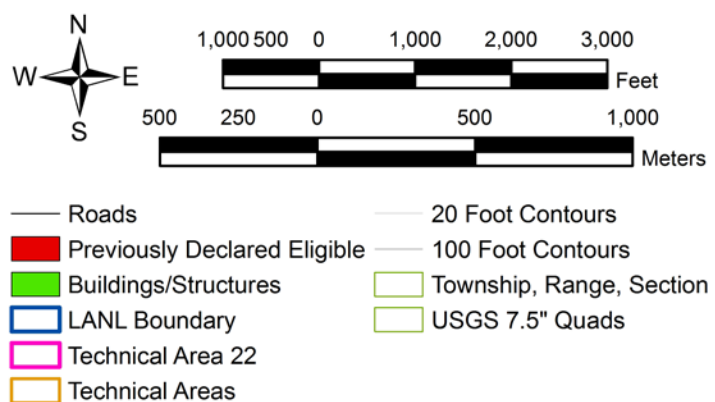
- Technical Area 22
- LANL Boundary
- Technical Areas
- Paved Roads

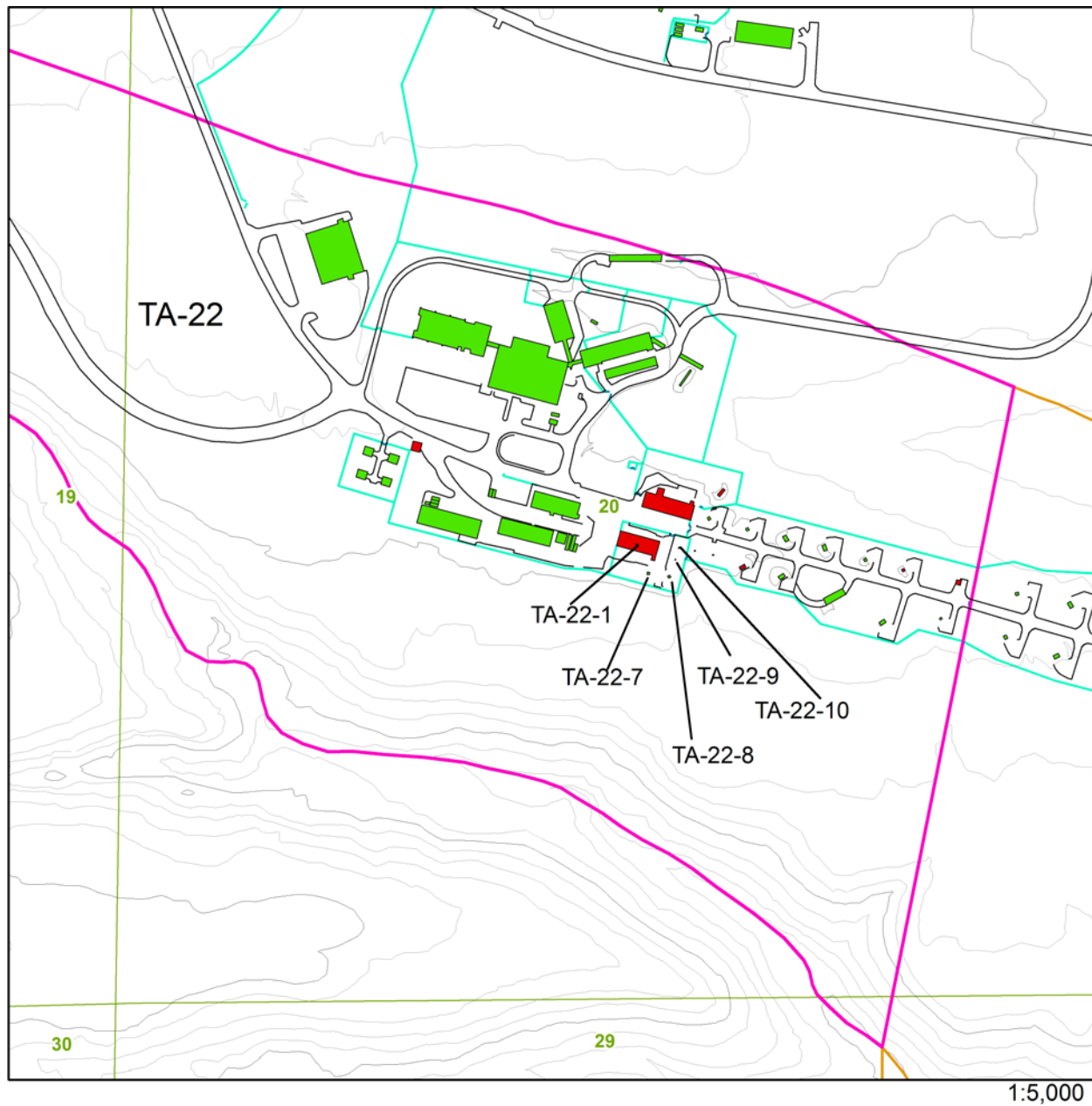
Map 1



**Los Alamos**  
National Laboratory  
Resources Management Team  
EPC-ES Environmental  
Stewardship Group

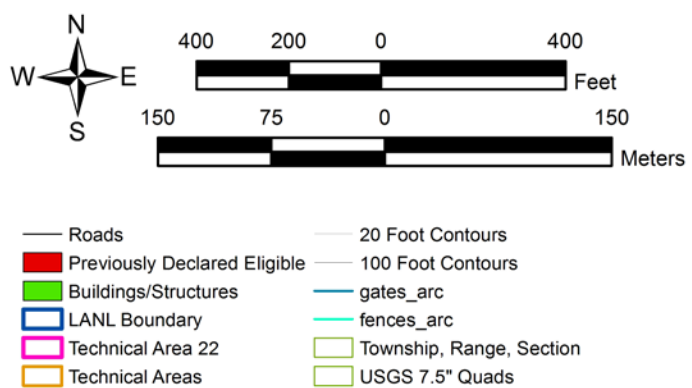
## TA-22 Overview





**Los Alamos**  
**National Laboratory**  
*Resources Management Team*  
*EPC-ES Environmental*  
*Stewardship Group*

## TA-22-7, -8, -9, & -10 Location Map



Map 3



**Los Alamos**  
**National Laboratory**  
*Resources Management Team*  
*EPC-ES Environmental*  
*Stewardship Group*

**TA-22-7, -8, -9, & -10**  
**Closeup**



- Roads
- 20 Foot Contours
- 100 Foot Contours
- gates\_arc
- fences\_arc
- Township, Range, Section
- USGS 7.5" Quads
- Previously Declared Eligible
- Buildings/Structures
- LANL Boundary
- Technical Area 22
- Technical Areas

Map 4

## HISTORICAL OVERVIEW

### Early Cold War Era (1946–1956)

The future of the early Laboratory was in question after the end of World War II. Many scientists and site workers left Los Alamos and went back to their pre-war lives. Norris Bradbury was appointed director of the Laboratory following J. Robert Oppenheimer's return to his pre-World War II duties. Bradbury felt that the nation needed "a laboratory for research into military applications of nuclear energy" (LANL 1993). In late 1945, General Groves directed Los Alamos personnel to begin stockpiling and developing additional atomic weapons. Post-war weapon assembly work was now tasked to Los Alamos's Z Division, which had been relocated to an airbase (now Sandia National Laboratories) in nearby Albuquerque, New Mexico (Gosling 2001).

In 1946, Los Alamos became involved in Operation Crossroads, the first of many atmospheric tests in the Pacific. Later in 1946, the U.S. Atomic Energy Commission (AEC) was established to act as a civilian steward for the new atomic technology born of World War II. The AEC formally took over the Laboratory in 1947, making a commitment to retain the Laboratory as a permanent weapons facility.

With the beginning of the Cold War in 1947, weapons research once again became a national priority. Weapons research at Los Alamos was spearheaded by Edward Teller and Stanislaw Ulam and focused on the development of the hydrogen bomb, the feasibility of which had been discussed at Los Alamos as early as 1946. The simmering Cold War came to a full boil in late 1949 with the successful test of Joe I, the Soviet Union's first atomic bomb. In January 1950, President Truman approved the development of the hydrogen bomb. Truman's decision led to the remobilization of the country's weapons laboratories and production plants. The year 1950 also marked the initial meeting of Los Alamos's Family Committee, a committee tasked with developing the first two thermonuclear devices (LANL 2001). In 1951, the Nevada Proving Ground was established and the first Nevada atmospheric test, known as Able, was conducted. In the same year, Laboratory scientists directed Operation Greenhouse in the Pacific and successfully conducted both the first thermonuclear test, known as George, and the first thermonuclear boosted test, Item. In 1952, the first thermonuclear bomb, known as Mike, was detonated at Enewetak Atoll in the Pacific (LANL 1993).<sup>1</sup> The Soviet Union responded with a successful fusion demonstration in August 1953, followed by a test of a hydrogen bomb in 1955. The arms race was on. By 1956, Los Alamos had successfully tested a new generation of high explosives (plastic-bonded explosives) and had begun to make improvements to the primary stage of a nuclear weapon (LANL 2001).

Although weapons research and development has always played a major role in the history of LANL, other key themes for the years 1942–1956 include supercomputing advancements, fundamental biomedical and health physics research, high explosives research and development, reactor research and development, pioneering physics research, and the development of the field of high-speed photography (McGehee and Garcia 1999). The Early Cold War era at the Laboratory ended in 1956, a date that marks the completion of all basic nuclear weapons design.

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<sup>1</sup> A better understanding of the Marshall Islands language has permitted a more accurate transliteration of Marshall Island names into English. Enewetak is now the preferred spelling (formerly Eniwetok).

Later research at the Laboratory focused on the engineering of nuclear weapons to fit specific delivery systems. The year 1956 was also the last year that Los Alamos was a closed city—the gates into the Los Alamos townsite came down in 1957.

## **Late Cold War Era (1956–1990)**

The Late Cold War era saw the Laboratory's continued support of the atmospheric testing programs in the Pacific and at the Nevada Test Site. In 1957, the first of many underground tests in Nevada was conducted, and in 1963, the Limited Test Ban Treaty was signed, which banned atmospheric testing and also nuclear weapons tests in the oceans and space (U.S. DOE 2000). Defense mission undertakings during this time included treaty and test ban verification programs such as the satellite detection of nuclear explosions, research and development of space-based weapons, and continued involvement with stockpile stewardship issues. Non-weapons undertakings supported nuclear medicine, genetic studies, National Aeronautics and Space Administration collaborations, superconducting research, contained fusion reaction research, and other types of energy research (McGehee and Garcia 1999).

## **The Cold War Ends**

The Cold War ended in the early 1990s. Its demise was marked by START, the Strategic Arms Reduction Treaty, which was signed by President George H. W. Bush and Soviet President Mikhail Gorbachev, and by President Bush's announcement in September 1991 of a unilateral decision to significantly decrease the U.S. nuclear weapons stockpile. That announcement was followed in June 1992 by an agreement between President Bush and Russian president Boris Yeltsin to reduce each country's nuclear arsenal gradually over the next decade. The arms race that had lasted nearly half a century was over (Machen et al. 2010).

# **TECHNICAL AREA DESCRIPTION**

## **Historical Background**

Wartime work at TA-22 or Trap Door Site (TD Site) focused on the handling of special assemblies, an operation that had previously been conducted at TA-25 (V-Site). Late in 1944, the Laboratory's Gadget (G) Division began the construction of four buildings on the south edge of Two-Mile Mesa to assemble Fat Man weapons and to perfect the "trap door" method, which was a safer and more efficient assembly design. Several buildings were used for this operation: two large prefabricated steel buildings (TA-22-1 and TA-22-4), two larger frame magazines (TA-22-2 and TA-22-3), and one log ranch house (TA-22-26) (Figure 1). In 1945, the high explosives components of the Fat Man bomb dropped on the city of Nagasaki were assembled in building TA-22-1 (LANL 1993, U.S. DOE 1986, McGehee et al. 2005, and McGehee et al. 2011).

After the assembly of the wartime Fat Man units, the four buildings were abandoned until 1948, when the detonator group X-7 (a successor to the G Division group) remodeled the buildings into office, laboratory, and fabrication space to replace detonator activities in adjacent TA-6 (Map 2). Detonator research and testing has been conducted at TA-22 ever since (LANL 1993, U.S. DOE 1986, McGehee et al. 2005, and McGehee et al. 2011).



**Figure 1. TA-22 (1950)**

Many buildings have been built at TA-22 since the wartime period, including numerous magazines; a multi-function warehouse, machine/plastics shop, and electronics lab (TA-22-5); a boiler (TA-22-6); a PETN recrystallization process building (TA-22-25); a laboratory (TA-22-34); and a shops and plating building (TA-22-52) (U.S. DOE 1986 and McGehee et al. 2005).

Other operations at TA-22 include chemistry, laser, and photo work in TA-22-34. Electroplating and, later, etching activities were conducted in TA-22-52. The electroplating operations at TA-22-52 were conducted over a 20- to 25-year period and supported the stripping and re-plating of the gold coating on the Laboratory's Ten Site reactor at TA-35 (U.S. DOE 1986 and McGehee et al. 2005).

## **Current Function**

Work at TA-22 currently focuses on the development and fabrication of detonation systems (Figure 2) (Map 3). Recent operations at TA-22 have been centered in buildings TA-22-91 and TA-22-93 (built in 1984). Detonation cables have been manufactured in building 91 through a photo-etching process that starts with a commercially available laminate of copper-coated plastic film. TA-22-93 is the detonator fabrication facility where detonators of all kinds have been made, mainly using the explosive PETN. A laboratory and testing facility have also been in operation at TA-22. This building, TA-22-34, was first occupied in the early 1950s (U.S. DOE 1986 and McGehee et al. 2005). Since 2000, several new detonator research and storage buildings have been built at TA-22, which include an office, a laboratory, and a magazine/storage space.

## ***Magazines TA-22-7, -8, -9, and -10***

Buildings TA-22-7, -8, -9, and -10 are typical high-explosives storage magazines. Safety features were incorporated into the design of the high-explosives facilities at TA-22, and safe quantities, safe distances, and appropriate levels of protection were considered for each type of explosives activity. These safety standards were first developed by the Department of Defense Explosives Safety Board in 1928. In general, magazines are built of reinforced concrete. Earthen berms at the sides of the magazines are designed to dampen the force of a potential explosion, while the shape of the magazines directs the force of an accidental explosion, thus decreasing the chance of

causing sympathetic or chain-reaction explosions at adjacent magazines. The amount of material stored in the magazines and the distance between them is regulated (McGehee et al. 2008 and U.S. DOD 2007).

Magazines TA-22-7, -8, -9, and -10 are associated with the Cold War-era research and testing of detonators. The magazines represent two of the three sizes of the 17 single-bay magazines built in 1949 at TA-22 and are constructed with reinforced concrete floors, walls, and flat roofs. The magazines are covered with a compacted earthen berm on three sides and the roof. Exposed concrete headwalls serve as a retaining system for the compacted earth (Figure 3). All four magazines are within a proposed MAPR boundary identified for building TA-22-1 (Map 4). One of these magazines (TA-22-9) was declared eligible for inclusion in the Register in DX Division's Facility Strategic Plan: Consolidation and Revitalization at Technical Areas 6, 8, 9, 14, 15, 22, 36, 39, 40, 60, and 69 (McGehee et al. 2005) in consultation with the State Historic Preservation Officer on April 18, 2006.

Magazines TA-22-7 and -8 are small walk-in type magazines with a floor capacity of 36 ft<sup>2</sup>. Magazine TA-22-7 has a solid pair of reinforced metal doors set within the headwall whereas magazine TA-22-8's reinforced metal doors have screened louvers. Magazines TA-22-9 and -10 are small "wall" magazines (steel storage vaults) set into a headwall with a capacity of only 8 ft<sup>2</sup>. These two magazines have single aluminum cabinet doors that replaced the original pair of aluminum cabinet doors (McGehee et al. 2005).



**Figure 2. TA-22 (1991)**



**Figure 3. TA-22 close-up of TA-22-1 and Magazines TA-22-7, -8, -9, & -10 (1991)**

## Building Descriptions

<b>Technical Area:</b>	22	<b>Associated Theme:</b>	Detonator R&D
<b>Building Number:</b>	7	<b>Property Type:</b>	Lab/Processing (2 <sup>nd</sup> Tier)
<b>Original Function:</b>	Magazine	<b>Integrity:</b>	Excellent
<b>Current Function:</b>	Process Building	<b>Core:</b>	Yes
<b>Date Constructed:</b>	1949	<b>Eligibility:</b>	Yes (Criteria A & C)

**Buildings with same floor plan within TA:** TA-22-8, -14, -15, -21, -23, -24

**Buildings with similar floor plan in other TAs:** TA-40-13



View of southwest side

### Architectural Description:

Magazine TA-22-7 is one of seven identical magazines located within TA-22.

The magazine is a one-story single-room building measuring 7 ft 8 in. by 6 ft 8 in. with a total interior floor capacity of 36 ft<sup>2</sup>. The building was constructed with a reinforced concrete foundation and floor slab, reinforced concrete walls, and a flat roof. The exposed concrete headwall has angled wing walls that serve as a retaining system for the compacted earth covering the remaining three sides and roof. The compacted

earth serves as a blast suppressor in the event the contents within the magazine explode. A pair of reinforced metal doors is set within the headwall and provides the only access into the magazine. To the right of the doors is a steel equipment shelf. A wooden pole set at the rear of the magazine supports a lightning rod. Historically, this magazine had a storage capacity of 200 grams of explosive material. TA-22-7 has most recently been identified as a Process Building.

### Historical Background:

This magazine continuously served as a reinforced storage facility for high explosives. It supported the Laboratory's detonator research and development program.

### Determination of Eligibility:

This building meets National Register of Historic Places criteria in that it possesses integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, the building is eligible for inclusion in the Register as a significant property within TA-22. The building is significant under Criterion A due to its association with the Laboratory's Cold War detonator research and development program. This building is also eligible under Criteria C for its characteristic design related to detonator research and testing. TA-22-7 has been identified as a candidate for preservation due to its association with the almost 40 years of Cold War-era detonator research conducted at adjacent building TA-22-1. Additionally, this magazine is within one of the 2014 legislatively proposed Manhattan Project National Historical Park boundaries at LANL.

**Technical Area:** 22  
**Building Number:** 8  
**Original Function:** Magazine  
**Current Function:** Process Building  
**Date Constructed:** 1949

**Associated Theme:** Detonator R&D  
**Property Type:** Lab/Processing (2<sup>nd</sup> Tier)  
**Integrity:** Excellent  
**Core:** Yes  
**Eligibility:** Yes (Criteria A & C)

**Buildings with same floor plan within TA:** TA-22-7, -14, -15, -21, -23, -24

**Buildings with similar floor plan in other TAs:** TA-40-13

### Architectural Description:

Magazine TA-22-8 is one of seven identical magazines located within TA-22.

The magazine is a one-story single-room building measuring 7 ft 8 in. by 6 ft 8 in. with a total interior floor capacity of 36 ft<sup>2</sup>. The building was constructed with a reinforced concrete foundation and floor slab, reinforced concrete walls, and a flat roof. The exposed concrete headwall has angled wing walls that serve as a retaining system for the compacted earth covering the remaining three sides and roof. The compacted earth serves as a blast suppressor in the event the contents within the magazine explode. A pair of reinforced metal doors with screened louvers is set within the headwall and provides the only access into the magazine. A wooden pole set at the rear of the magazine supports a lightning rod.



View of southeast side

This magazine is virtually identical to TA-22-7 with a few minor differences. TA-22-8's doors have screened louvers whereas TA-22-7's doors do not. Additionally, TA-22-8 has a vent stack that protrudes through the roof.

### Historical Background:

This magazine has continuously served as a reinforced storage facility for high explosives. It supports the Laboratory's detonator research and development program.

### Determination of Eligibility:

This building meets National Register of Historic Places criteria in that it possesses integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, the building is eligible for inclusion in the Register as a significant property within TA-22. The building is significant under Criterion A due to its association with the Laboratory's Cold War detonator research and development program. This building is also eligible under Criteria C for its characteristic design related to detonator research and testing. TA-22-8 has been identified as a candidate for preservation due to its association with the almost 40 years of Cold War-era detonator research conducted at adjacent building TA-22-1. Additionally, this magazine is within one of the 2014 legislatively proposed Manhattan Project National Historical Park boundaries at LANL.

**Technical Area:** 22  
**Building Number:** 10  
**Original Function:** Magazine  
**Current Function:** Magazine  
**Date Constructed:** 1949

**Associated Theme:** Detonator R&D  
**Property Type:** Lab/Processing (2<sup>nd</sup> Tier)  
**Integrity:** Excellent  
**Core:** Yes  
**Eligibility:** Yes (Criteria A & C)

**Buildings with same floor plan within TA:** TA-22-9, -11, -12



View of southeast side

#### **Architectural Description:**

Magazine TA-22-10 is one of four identical magazines located within TA-22.

The magazine is a one-story building measuring 2 ft 8 in. by 4 ft with a single 8-ft<sup>2</sup> storage vault. The building was constructed with a reinforced concrete foundation and floor slab, reinforced concrete walls, and a flat roof. The exposed concrete headwall has angled wing walls that serve as a retaining system for the compacted earth covering the remaining three sides and roof. The compacted earth functions as a blast

suppressor in the event the contents within the magazine explode. Set within the headwall is the steel storage vault that has a single aluminum cabinet door that replaced the original pair of aluminum cabinet doors. A steel equipment shelf is located to the right of the storage vault. Historically, this magazine had a storage capacity of 3.5 kg of explosive material.

This magazine is identical to TA-22-9 except it has a smaller, historical, storage capacity limit.

#### **Historical Background:**

This magazine has continuously served as a reinforced storage facility for high explosives. It supports the Laboratory's detonator research and development program.

#### **Determination of Eligibility:**

This building meets National Register of Historic Places criteria in that it possesses integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, the building is eligible for inclusion in the Register as a significant property within TA-22. The building is significant under Criterion A due to its association with the Laboratory's Cold War detonator research and development program. This building is also eligible under Criteria C for its characteristic design related to detonator research and testing. TA-22-10 has been identified as a candidate for preservation due to its association with the almost 40 years of Cold War-era detonator research conducted at adjacent building TA-22-1. Additionally, this magazine is within one of the 2014 legislatively proposed Manhattan Project National Historical Park boundaries at LANL.

## CONCLUSION

Magazines TA-22-7, -8, and -10 were constructed in 1949, shortly after TA-22 was repurposed from a wartime assembly area to a post-war center for detonator work, effectively replacing the wartime detonator operations at nearby TA-6. Magazines TA-22-7, -8, and -10 are eligible for listing in the Register under Criterion A for their association with important Cold War-era weapons detonator research and testing. The magazines are also eligible under Criterion C for their unique designs related to their Cold War scientific and support functions as reinforced storage facilities for high explosives.

In addition to Register evaluation, the three historic properties at TA-22 were assessed for their long-term preservation and public interpretation potential and are considered candidates for preservation due to their association with the Cold War-era use of TA-22-1 (Fat Man assembly building). Furthermore, the three magazines along with magazine TA-22-9 (previously declared eligible in 2006) are within a proposed MAPR boundary at Los Alamos included in the 2014 legislation.

In accordance with the National Historic Preservation Act of 1966, as amended, and with the PA, the State Historic Preservation Officer is requested to concur with the eligibility determinations contained in this report for the three Cold War-era properties at TA-22.

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## **APPENDIX A. Historic Building Inventory Forms with Selected Photographs and Building Drawings for TA-22-7, -8, and -10**